

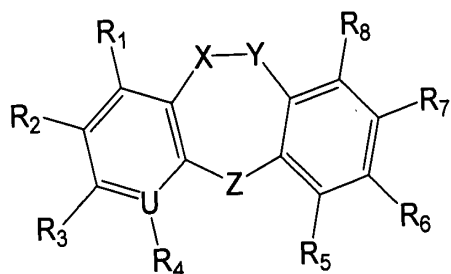
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Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) A compound represented by formula (1),



Formula 1

wherein

when the X-Y bond is a single bond, X and Y, ~~which may be the same or different~~, are each independently ~~any one~~ selected from the group consisting of:

CW₁W₂ (wherein W₁ and W₂, ~~which may be the same or different~~, are each independently selected from the group consisting of ~~any~~ one of a hydrogen atom, a halogen, a hydroxyl group, a lower alkyl group, a substituted lower alkyl group, a lower alkoxy group, a cycloalkyl group and a cycloalkenyl group),

C=O, and

C=NOW₃ (wherein W₃ is a hydrogen atom or a lower alkyl group);

when the X-Y bond is a double bond, X and Y, ~~which may be the same or different~~, are each independently CW₄ (wherein W₄ is any one of a hydrogen atom, a halogen, a hydroxyl

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group, a lower alkyl group, a substituted lower alkyl group, a lower alkoxy group or an acyloxy group;

Z is ~~any one selected from O, S, S=O and SO₂~~;

U is C ~~or N~~;

R₁ to R₄, ~~which may be the same or different~~, are each independently ~~any one~~ selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group, a substituted cycloalkyl group, a lower alkenyl group, a substituted lower alkenyl group, a lower alkynyl group, a substituted lower alkynyl group, a halogen, a lower alkylcarbonyl group, a substituted lower alkylcarbonyl group, a trihalomethyl group, V₁W₅ (~~wherein V₁ is any one of O, S, S=O and SO₂~~; and ~~W₅ is any one of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylcarbonyl group, an acyloxy group and a trihalomethyl group~~), a nitro group, an amino group, a substituted amino group, a cyano group, an acyl group, an acylamino group, a substituted acyl group, a substituted acylamino group, an aromatic ring, a substituted aromatic ring, a heterocycle and a substituted heterocycle (~~when U is N, R₄ does not exist in some cases~~) wherein

V₁ is any one of O, S, S=O or SO₂

W₅ is any one of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylcarbonyl group, an acyloxy group or a trihalomethyl group, and

R₅ to R₈, ~~which may be the same or different~~, are each independently ~~any one~~ selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkenyl group, a substituted lower alkenyl group, a lower alkynyl group, a substituted lower alkynyl group, a halogen, a lower alkylcarbonyl group, a substituted lower

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alkylcarbonyl group, a trihalomethyl group, V_2W_7 (wherein V_2 is any one selected from O, S, S=O and SO_2 ; and W_7 is any one selected from a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group, a substituted lower alkylcarbonyl group and a trihalomethyl group), a nitro group, an amino group, a substituted amino group, an acylamino group, an aromatic ring, a substituted aromatic ring, a heterocycle and a substituted heterocycle; wherein

V_2 is one of O, S, S=O or SO_2 .

W_7 is one of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group, a substituted lower alkylcarbonyl group or a trihalomethyl group.

wherein:

when X is CHW_0 , CW_0W_0 or CW_0 provided that at least one of R_5 to R_8 is a hydroxyl group, provided that at least one of R_5 , R_7 or R_8 is a hydroxy group when the X-Y bond is $CH(C_2H_5)CO$ and R_6 is a hydroxyl group when X is CHW_0 , CW_0W_0 or CW_0 (wherein W_0 is any one selected from a lower alkyl group and a substituted lower alkyl group) and

when X is other than CHW_0 , CW_0W_0 or CW_0 at least one of R_5 to R_8 is a hydroxyl group and, at the same time, at least one of the other R_5 to R_8 is a group of OR (wherein R is any one selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylsilyl group) when X is other than CHW_0 , CW_0W_0 or CW_0 (wherein

W_0 is any one selected from the group consisting of a lower alkyl group and a substituted lower alkyl group) and

R is any one selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylsilyl group; and

in addition, when the X-Y is CH_2CH_2 , $CHBrCH_2$, CH_2CO , $CHBrCO$, $CH=CH$, $CH=COCOCH_3$ or $CH=COCH_3$,

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at least one of R_1 to R_4 is an aromatic ring, a substituted aromatic ring, a heterocycle or a substituted heterocycle (provided that when both R_6 and R_7 are hydroxyl groups, any one of R_1 to R_4 is not a phenyl group); or

at least one of R_1 to R_4 is SW_8 (~~wherein W_8 is a lower alkyl group or a substituted lower alkyl group~~) or $S(O)W_9$ (wherein W_8 and W_9 independently is are a lower alkyl group or a substituted lower alkyl group) (provided that R_7 is not a hydrogen atom when Z is O); or

R_2 is either a lower alkyl group or a substituted lower alkyl group and, at the same time, R_8 is a hydroxyl group (provided that the number of carbon atoms of the lower alkyl group is 3 or more when Z is O); or

at least one of R_1 to R_4 is a lower alkylcarbonyl group (provided that the number of carbon atoms of the lower alkyl group is 3 or more), a cycloalkylcarbonyl group or a cycloalkenylcarbonyl group and, at the same time, R_8 is a hydroxyl group; or

at least one of R_1 to R_4 is a cyano group; or

~~at least one of R_1 to R_4 is a halogen and, at the same time, Z is any one of S, S=O and SO_2 ; or~~

~~— R_5 and R_6 are hydroxyl groups and, at the same time, Z is S; or~~

at least one of R_1 to R_4 is $-C(=NOR)CH_3$ (wherein R is a hydrogen atom or a lower alkyl group), an optical isomer thereof, a conjugate thereof or a pharmaceutically acceptable salt thereof.

2. (original) The compound according to claim 1, wherein R_6 is a hydroxyl group.
3. (original) The compound according to claim 1, wherein R_6 and R_7 are hydroxyl groups.
4. (original) The compound according to claim 1, wherein R_6 and R_8 are hydroxyl groups.

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5. (original) The compound according to claim 1, wherein R₅ and R₆ are hydroxyl groups.

6. (currently amended) The compound according to ~~any one of claims claim~~ claim 1 to 5, wherein the X-Y bond is a single bond and X is CW₁W₂ (~~wherein at least one of W₁ and W₂ is any one selected from a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group~~) or the X-Y bond is a double bond and X is CW (~~wherein W is any one selected a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group~~), wherein

at least one of W₁ and W₂ is selected from the group consisting of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group and

W is one of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group or a cycloalkenyl group.

7. (currently amended) The compound according to ~~any one of claims claim~~ claim 1 to 6, wherein Y is CO.

8. (currently amended) The compound according to claim 6 ~~or claim 7~~, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group ~~and or~~ a *tert*-butyl group.

9. (currently amended) The compound according to ~~any one of claims claim~~ claim 1 to 5, wherein R₂ or R₃ is any one of a heterocycle, a substituted heterocycle, an aromatic ring ~~and or~~ a substituted aromatic ring.

10. (currently amended) The compound according to ~~any one of claims claim~~ claim 1 to 5, wherein the heterocycle is an aromatic heterocycle.

11. (currently amended) The compound according to ~~any one of claims claim~~ claim 1 to 5, wherein R₂ or R₃ is SW₈ (~~wherein W₈ is a lower alkyl group or a substituted lower alkyl group~~) or S(O)W₉ (~~wherein W₉ is a lower alkyl group or a substituted alkyl group~~), wherein

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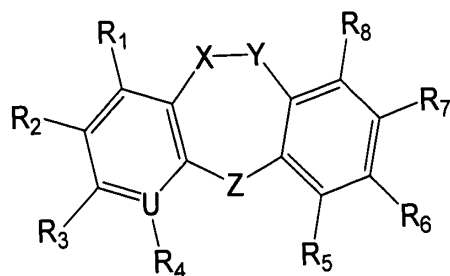
W₈ is a lower alkyl group or a substituted lower alkyl group, and

W₉ is a lower alkyl group or a substituted alkyl group.

12. (currently amended) The compound according to claim 11, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

13-16. (canceled)

17. (currently amended) A method of preparing a compound represented by formula (1),



Formula 1

wherein

when the X-Y bond is a single bond, X and Y, ~~which may be the same or different,~~ are each independently ~~any one~~ selected from the group consisting of:

CW₁W₂ (wherein W₁ and W₂, ~~which may be the same or different,~~ are each independently selected from the group consisting of ~~any~~ one of a hydrogen atom, a halogen, a hydroxyl group, a lower alkyl group, a substituted lower alkyl group, a lower alkoxy group, a cycloalkyl group and a cycloalkenyl group),

C=O, and

C=NOW₃ (wherein W₃ is a hydrogen atom or a lower alkyl group);

when the X-Y bond is a double bond, X and Y, ~~which may be the same or different,~~ are each independently CW₄ (wherein W₄ is any one of a hydrogen atom, a halogen, a hydroxyl

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group, a lower alkyl group, a substituted lower alkyl group, a lower alkoxy group or an acyloxy group);

Z is ~~any one selected from~~ O, S, S=O and SO₂;

U is C ~~or N~~;

R₁ to R₄, ~~which may be the same or different~~, are each independently ~~any one~~ selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group, a substituted cycloalkyl group, a lower alkenyl group, a substituted lower alkenyl group, a lower alkynyl group, a substituted lower alkynyl group, a halogen, a lower alkylcarbonyl group, a substituted lower alkylcarbonyl group, a trihalomethyl group, V₁W₅ (~~wherein V₁ is any one of O, S, S=O and SO₂; and W₅ is any one of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylcarbonyl group, an acyloxy group and a trihalomethyl group~~), a nitro group, an amino group, a substituted amino group, a cyano group, an acyl group, an acylamino group, a substituted acyl group, a substituted acylamino group, an aromatic ring, a substituted aromatic ring, a heterocycle and a substituted heterocycle (~~when U is N, R₄ does not exist in some cases~~) wherein

V₁ is any one of O, S, S=O or SO₂

W₅ is any one of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylcarbonyl group, an acyloxy group or a trihalomethyl group, and

R₅ to R₈, ~~which may be the same or different~~, are each independently ~~any one~~ selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkenyl group, a substituted lower alkenyl group, a lower alkynyl group, a substituted lower alkynyl group, a halogen, a lower alkylcarbonyl group, a substituted lower

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alkylcarbonyl group, a trihalomethyl group, V_2W_7 (wherein V_2 is any one selected from O, S, S=O and SO_2 ; and W_7 is any one selected from a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group, a substituted lower alkylcarbonyl group and a trihalomethyl group), a nitro group, an amino group, a substituted amino group, an acylamino group, an aromatic ring, a substituted aromatic ring, a heterocycle and a substituted heterocycle; wherein

V_2 is one of O, S, S=O or SO_2 ,

W_7 is one of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group, a substituted lower alkylcarbonyl group or a trihalomethyl group,

wherein:

when X is CHW_0 , CW_0W_0 or CW_0 provided that at least one of R_5 to R_8 is a hydroxyl group, [provided that at least one of R_5 , R_7 or R_8 is a hydroxy group when the X-Y bond is $CH(C_2H_5)CO$ and R_6 is a hydroxyl group] when X is CHW_0 , CW_0W_0 or CW_0 (wherein W_0 is any one selected from a lower alkyl group and a substituted lower alkyl group) and

when X is other than CHW_0 , CW_0W_0 or CW_0 at least one of R_5 to R_8 is a hydroxyl group and, at the same time, at least one of the other R_5 to R_8 is a group of OR (wherein R is any one selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylsilyl group) when X is other than CHW_0 , CW_0W_0 or CW_0 (wherein

W_0 is any one selected from the group consisting of a lower alkyl group and a substituted lower alkyl group) and

R is any one selected from the group consisting of a hydrogen atom, a lower alkyl group, a substituted lower alkyl group, a lower alkylcarbonyl group and a substituted lower alkylsilyl group; and

in addition, when the X-Y is CH_2CH_2 , $CHBrCH_2$, CH_2CO , $CHBrCO$, $CH=CH$, $CH=COCOCH_3$ or $CH=COCH_3$,

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at least one of R₁ to R₄ is an aromatic ring, a substituted aromatic ring, a heterocycle or a substituted heterocycle (provided that when both R₆ and R₇ are hydroxyl groups, any one of R₁ to R₄ is not a phenyl group); or

at least one of R₁ to R₄ is SW₈ (~~wherein W₈ is a lower alkyl group or a substituted lower alkyl group~~) or S(O)W₉ (~~wherein W₈ and W₉ independently are a lower alkyl group or a substituted lower alkyl group~~) (provided that R₇ is not a hydrogen atom when Z is O); or

R₂ is either a lower alkyl group or a substituted lower alkyl group and, at the same time, R₈ is a hydroxyl group (provided that the number of carbon atoms of the lower alkyl group is 3 or more when Z is O); or

at least one of R₁ to R₄ is a lower alkylcarbonyl group (provided that the number of carbon atoms of the lower alkyl group is 3 or more), a cycloalkylcarbonyl group or a cycloalkenylcarbonyl group and, at the same time, R₈ is a hydroxyl group; or

at least one of R₁ to R₄ is a cyano group; or

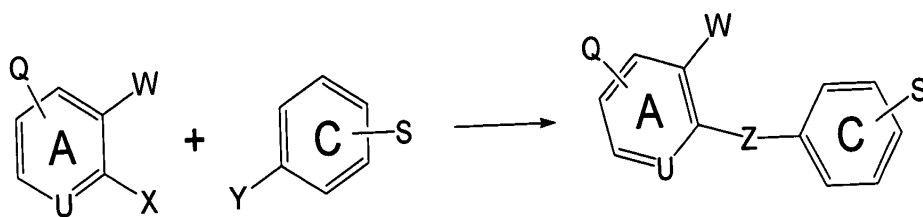
~~at least one of R₁ to R₄ is a halogen and, at the same time, Z is any one of S, S=O and SO₂; or~~

~~— R₅ and R₆ are hydroxyl groups and, at the same time, Z is S; or~~

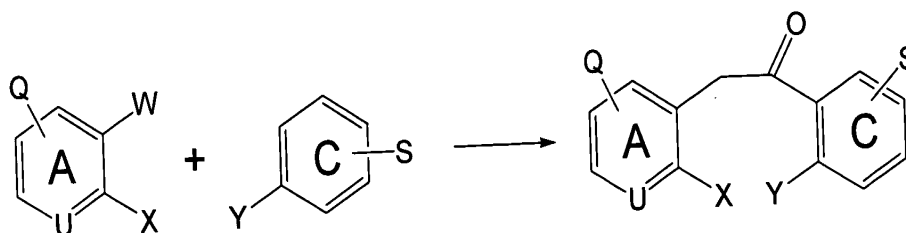
at least one of R₁ to R₄ is -C(=NOR)CH₃ (wherein R is a hydrogen atom or a lower alkyl group), an optical isomer thereof, a conjugate thereof or a pharmaceutically acceptable salt thereof,

which comprises, in any order, the reaction steps of (1) bonding a ring A to a ring C by the Ullmann reaction as shown in formula 2 and (2) bonding a ring A to a ring C by the Friedel-Crafts reaction or ~~photoreaction~~ photoreaction as shown in formula 3,

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Formula 2



Formula 3

wherein

Q, S and W are each any ~~substituent~~ substituent;

U is C ~~or~~ N;

one of X and Y is ~~an~~ a leaving group and the other is a nucleophilic group; and

Z is ~~any one of O, S, SO and SO₂~~.

18. (currently amended) The method according to claim 17 further comprising at least one ~~step of the~~ a ~~step of~~ carbon atom increasing reaction, ~~the step of a~~ conversion reaction of a substituent, ~~the step of an~~ introduction reaction of a substituent, ~~the step of a~~ removal of the protection of a substituent, ~~the step of forming a salt~~, and ~~the step of performing optical~~ resolution.

19. (currently amended) A pharmaceutical composition comprising an effective amount of the compound ~~described in any one of claim~~ claims 1 to 16 and a pharmaceutically acceptable carrier or diluent.

20. (currently amended) The pharmaceutical composition according to claim 19 wherein the pharmaceutical composition ~~which~~ utilizes the tracheal smooth muscles relaxing action of the compound.

21. (currently amended) The pharmaceutical composition according to claim 19 wherein the pharmaceutical composition which utilizes the ~~inhibitory~~ inhibitory effect on airway hypersensitivity of the compound.

22. (currently amended) The pharmaceutical composition according to claim 19 wherein the pharmaceutical composition which utilizes the inhibitory effect on inflammatory cells infiltration of the compound.

23. (currently amended) The pharmaceutical composition according to claim 19 wherein the pharmaceutical composition which is used as the ~~antiasthmatic~~ anti-asthmatic drug.

24 -25. (canceled)

26. (new) The compound of claim 1 wherein X and Y are the same.

27. (new) The compound of claim 1 wherein X and Y are different.

28. (new) The compound of claim 1 wherein W_1 and W_2 are the same.

29. (new) The compound of claim 1 wherein W_1 and W_2 are different.

30. (new) The compound of claim 1 wherein R_1 to R_4 are the same.

31. (new) The compound of claim 1 wherein R_1 to R_4 are different.

32. (new) The compound of claim 1 wherein R_5 to R_8 are the same.

33. (new) The compound of claim 1 wherein R_5 to R_8 are different.

34. (new) The compound according to claim 2, wherein the X-Y bond is a single bond and X is CW_1W_2 or the X-Y bond is a double bond and X is CW, wherein at least one of W_1 and W_2 is selected from the group consisting of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group and

W is one of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group or a cycloalkenyl group.

35. (new) The compound according to claim 3, wherein the X-Y bond is a single bond and X is CW_1W_2 or the X-Y bond is a double bond and X is CW, wherein

at least one of W_1 and W_2 is selected from the group consisting of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group and

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W is one of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group or a cycloalkenyl group.

36. (new) The compound according to claim 4, wherein the X-Y bond is a single bond and X is CW_1W_2 or the X-Y bond is a double bond and X is CW, wherein at least one of W_1 and W_2 is selected from the group consisting of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group and

W is one of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group or a cycloalkenyl group.

37. (new) The compound according to claim 5, wherein the X-Y bond is a single bond and X is CW_1W_2 or the X-Y bond is a double bond and X is CW, wherein at least one of W_1 and W_2 is selected from the group consisting of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group and a cycloalkenyl group and

W is one of a lower alkyl group, a substituted lower alkyl group, a cycloalkyl group or a cycloalkenyl group.

38. (new) The compound according to claim 2, wherein Y is CO.

39. (new) The compound according to claim 3, wherein Y is CO.

40. (new) The compound according to claim 4, wherein Y is CO.

41. (new) The compound according to claim 5, wherein Y is CO.

42. (new) The compound according to claim 6, wherein Y is CO.

43. (new) The compound according to claim 1, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

44. (new) The compound according to claim 2, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

45. (new) The compound according to claim 3, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

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46. (new) The compound according to claim 4, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

47. (new) The compound according to claim 5, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

48. (new) The compound according to claim 6, wherein the lower alkyl group is any one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group or a *tert*-butyl group.

49. (new) The compound according to claim 2, wherein R₂ or R₃ is any one of a heterocycle, a substituted heterocycle, an aromatic ring or a substituted aromatic ring.

50. (new) The compound according to claim 3, wherein R₂ or R₃ is any one of a heterocycle, a substituted heterocycle, an aromatic ring or a substituted aromatic ring.

51. (new) The compound according to claim 4, wherein R₂ or R₃ is any one of a heterocycle, a substituted heterocycle, an aromatic ring or a substituted aromatic ring.

52. (new) The compound according to claim 5, wherein R₂ or R₃ is any one of a heterocycle, a substituted heterocycle, an aromatic ring or a substituted aromatic ring.

53. (new) The compound according to claim 2, wherein R₂ or R₃ is SW₈ or S(O)W₉,
wherein

W₈ is a lower alkyl group or a substituted lower alkyl group, and

W₉ is a lower alkyl group or a substituted alkyl group.

54. (new) The compound according to claim 3, wherein R₂ or R₃ is SW₈ or S(O)W₉,
wherein

W₈ is a lower alkyl group or a substituted lower alkyl group, and

W₉ is a lower alkyl group or a substituted alkyl group.

55. (new) The compound according to claim 4, wherein R₂ or R₃ is SW₈ or S(O)W₉,
wherein

W₈ is a lower alkyl group or a substituted lower alkyl group, and

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W₉ is a lower alkyl group or a substituted alkyl group.

56. (new) The compound according to claim 5, wherein R₂ or R₃ is SW₈ or S(O)W₉,
wherein

W₈ is a lower alkyl group or a substituted lower alkyl group, and

W₉ is a lower alkyl group or a substituted alkyl group.

57. (new) The compound according to claim 56, wherein the lower alkyl group is an one of a methyl group, an ethyl group, a *n*-propyl group, an isopropyl group, an *n*-butyl group, a *sec*-butyl group, an isobutyl group, or a *tert*-butyl group.

58. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 2 and a pharmaceutically acceptable carrier or diluent.

59. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 3 and a pharmaceutically acceptable carrier or diluent.

60. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 4 and a pharmaceutically acceptable carrier or diluent.

61. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 5 and a pharmaceutically acceptable carrier or diluent.

62. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 6 and a pharmaceutically acceptable carrier or diluent.

63. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 7 and a pharmaceutically acceptable carrier or diluent.

64. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 8 and a pharmaceutically acceptable carrier or diluent.

65. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 9 and a pharmaceutically acceptable carrier or diluent.

66. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 10 and a pharmaceutically acceptable carrier or diluent.

67. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 11 and a pharmaceutically acceptable carrier or diluent.

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68. (new) A pharmaceutical composition comprising an effective amount of the compound of claim 12 and a pharmaceutically acceptable carrier or diluent.